VARIOUS CLINICAL PRESENTATIONS AND TREATMENT MODALITIES OF CARCINOMA RECTUM

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CERTIFICATE

This is to certify that this dissertation titled **"VARIOUS CLINICAL PRESENTATIONS AND TREATMENT MODALITIES OF CARCINOMA RECTUM"**submitted by **DR.S.THIRUMALAI KANNAN** to the faculty of General Surgery, The TamilNadu Dr. M.G.R. Medical University, Chennai in partial fulfillment of the requirement for the award of MS degree Branch I General Surgery, is a bonafide research work carried out by him under our direct supervision and guidance from 2009 to 2012.

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DECLARATION

I**, DR.S.THIRUMALAI KANNAN** solemnly declare that the dissertation titled **"VARIOUS CLINICAL PRESENTATIONS AND TREATMENT MODALITIES OF CARCINOMA RECTUM"**has been prepared by me.This is submitted to **The TamilNadu Dr. M.G.R. Medical University, Chennai,** in partial fulfillment of the regulations for the award of MS degree (Branch I) General Surgery.

Place: Madurai **DR.S.THIRUMALAIKANNAN**

Date:

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Last but not least,my gratitude to all the patients who submitted themselves for this study.

CONTENTS

INTRODUCTION

Rectal cancer is among the most frequent cancers in the world.

There is considerable geographical variation. The incidence is high in western countries [1,3]. High intake of fat and calories, use of alcohol and tobacco is associated with increased risk. High intake of diet rich in fiber is associated with decreased risk [1].

Hereditary disorders such as HNPCC associated with 1-3% of all rectal carcinoma. FAP associated with <1% of all rectal carcinoma [1].

Incidence in males is more common than females. Incidence is rising steadily after the age of 50.Morethan 90% of cases diagnosed are in people older than 50 years of age. However individuals at any age can develop [1].

Prognosis for rectal carcinoma has improved since the 1960s, and this is probably due to early diagnosis, better preoperative tumor staging, improved intra-operative care, improved surgical technique and improved adjuvant treatments such as radiation and chemotherapy.

Incidence of local recurrence and distant metastasis also has decreased because of the above said reasons. But still the management of local recurrence is difficult.

AIM OF THE STUDY

1. To determine the predominant age and sex presenting with carcinoma rectum.
2. To study the incidence of various clinical manifestations of carcinoma rectum.
3. To find out the incidence of site of involvement of carcinoma rectum
4. To study the incidence of various stages of carcinoma rectum at presentation.
5. To evaluate the role of neo adjuvant chemo radiation.
6. To evaluate the surgical modalities of carcinoma rectum.
7. To find out the incidence of morbidity and mortality following surgical management of carcinoma rectum.

ANATOMY

Rectum

Begins at the level of sacral promontory.

Follows the curve of sacrum and ends at anorectal junction.

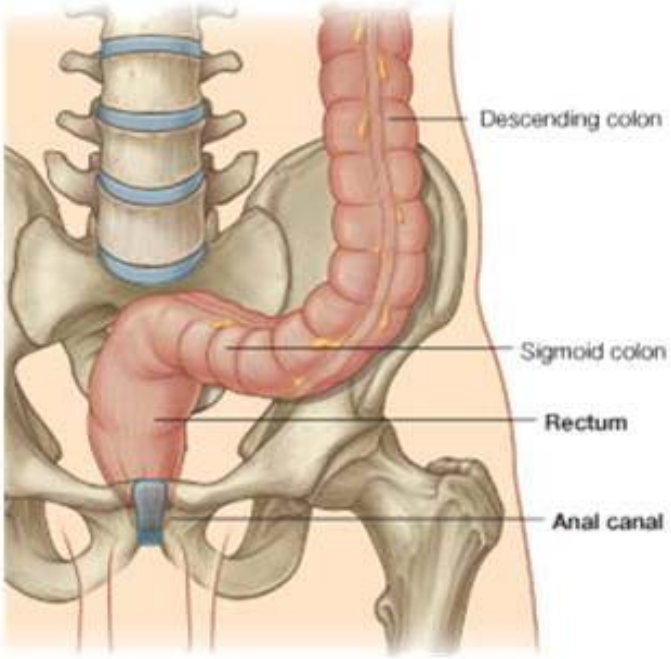
Is 12-15 cms in length.

Has 3 lateral curvatures - Upper and lower are convex to the right
Middle is convex to the left.

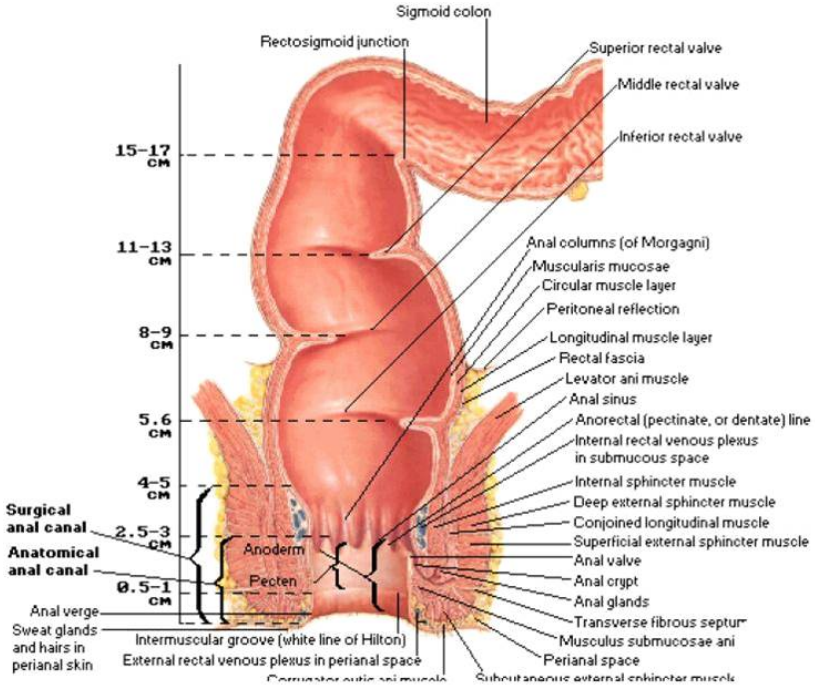
On luminal aspect, 3 curvatures are marked by Houstan's Valve.

Rectum divided into

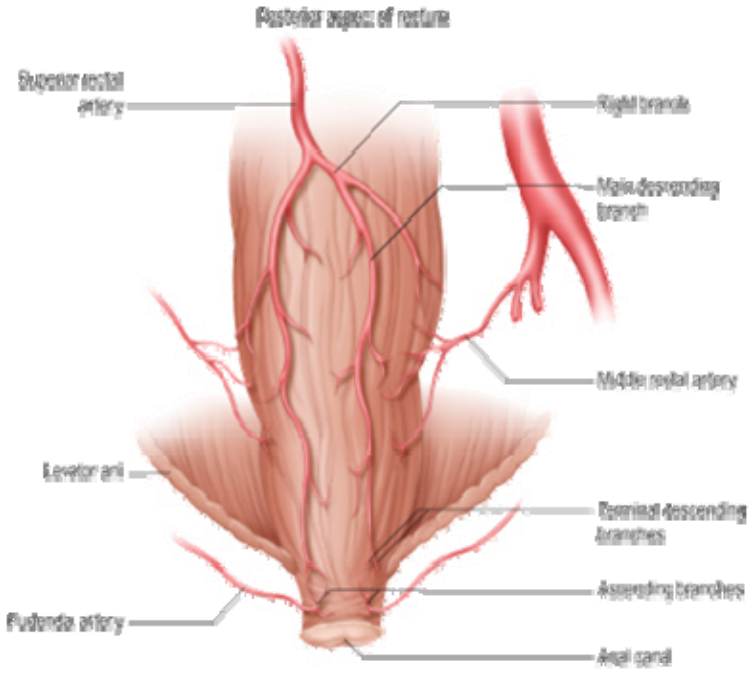
- Upper 1/3 rd - has peritoneal covering.
- Middle 1/3rd – peritoneum covers anterior and part of the lateral surfaces.
- Lower 1/3rd lies deep in the pelvis surrounded by fatty mesorectum.



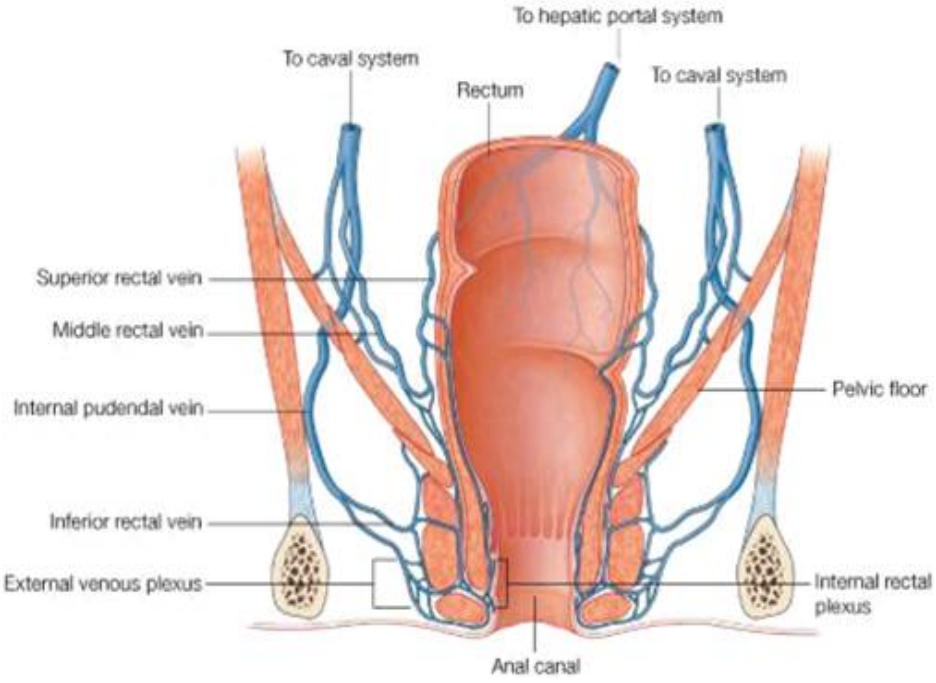
ANATOMICAL LOCATION OF RECTUM



CORONAL SECTION OF RECTUM



ARTERIAL SUPPLY OF RECTUM



VENOUS DRAINAGE OF RECTUM

Lower 1/3rd of rectum separated by:

Denovillier's fascia from prostate in males and vagina in females,

Waldeyer's fascia from the coccyx and lower 2 sacral vertebra[2].

Arterial supply

Upper 1/3 rd - superior rectal artery – branch from inferior mesenteric artery

Middle 1/3rd - middle rectal artery – branch of internal iliac artery

Lower 1/3rd – inferior rectal artery – branch of internal pudendal artery [1].

Venous drainage

Superior rectal vein – drains into portal system through inferior mesenteric vein.

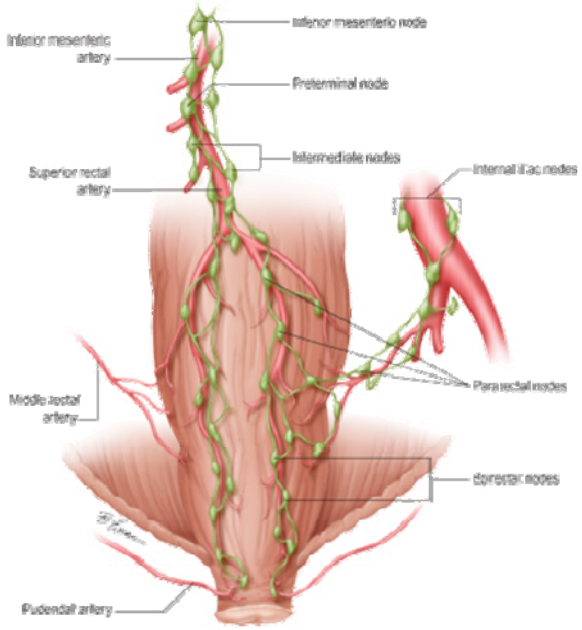
Middle rectal vein – drains into caval system through internal iliac vein.

Inferior rectal vein – drains into caval system through internal pudendal vein [1].

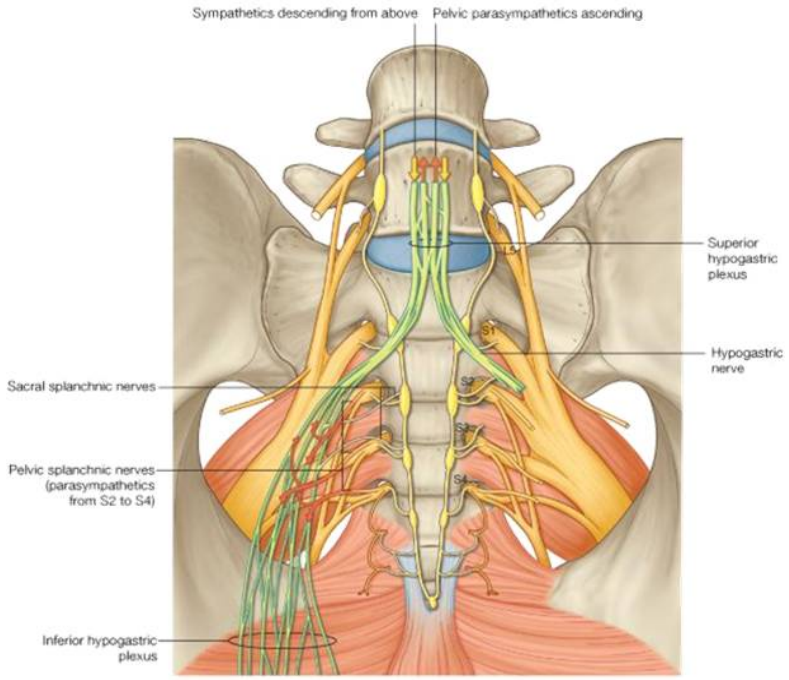
Lymphatic drainage

Parallel to the vascular supply.

Upper and middle rectum – drains into inferior mesenteric lymph nodes



LYMPHATIC DRAINAGE OF RECTUM



NERVE SUPPLY OF RECTUM

Lower rectum – drains superiorly into inferior mesenteric nodes laterally into internal iliac nodes[1].

Nerve supply

Sympathetic fibers – from L1-L3 – forms hypo gastric plexus at sacral promontary which subsequently joins parasympathetic fibers to form pelvic plexus at the lateral wall of rectum.

Parasympathetic fibers – nervi erigentes – from S2-S4 join sympathetic fibers to form pelvic plexus at the lateral wall of rectum [1].

PATHOPHYSIOLOGY

Normally colonic mucosa regenerates approximately every 6 days. Cells migrates from base of crypts to the surface where it undergoes differentiation, maturation and degeneration.

I. Adenoma may precede into adenocarcinoma by adenoma to carcinoma sequence [1,3].

II. APC Adenoma carcinoma pathway

Mutation in APC gene

↓

Unchecked cellular replication at crypt surface

↓

Further mutation leads to K-ras oncogene mutation in early stage and P53 mutation in later stage

↓

Prevents apoptosis and prolong the cells life span indefinitely.

III. Mutation in DNA mismatch repair genes found in 90% of HNPCC, and 15% of sporadic rectal cancers [8].

IV. Ulcerative colitis dysplasia

Chronic inflammation → Genetic alterations → dysplasia → carcinoma[3].

EPIDEMIOLOGY

Incidence of colorectal cancers tends to be higher in western than in Asian and Africans.

Approximate incidence per 1,00,000 people

Africa	-	2
Asia	-	15
South America	-	15
West Europe	-	40
USA	-	35

Although the incidence of colon and rectal cancer varies considerably by country, an estimated 944,717 cases identified worldwide in 2000[4].

Sex

Incidence in males is slightly higher than in female.

In males	-	65/100000
In females	-	47/100000

The male female ratio is 1.37% [4].

Age

Incidence of colorectal cancer starts to increase after the age of 35 and rises rapidly after the age of 50, peaking in seventh decade. This shows that prolonged exposure to weak environmental carcinogens is necessary to induce tumors and that most, possibly all, pass through the benign phase before turning into malignant [4].

ETIOLOGY

Multifactorial in origin including environmental, genetic factors.75% of cases are sporadic and 15-20% of cases are associated with family history, personal history of colorectal cancers/ polyps.

Other risk factors - HNPCC - 1-3%

FAP – 1%

IBD – 1% [1].

Environmental factors

Diet

High fat diet and low fiber diet increases the risk of developing colorectal carcinoma. Fiber diet forms soft bulky stools which dilute the

carcinogens and decreases the colonic transit time, thereby allowing less time for carcinogens to contact with mucosa. Increased dietary intake of calcium binds with fatty acids and bile acids which lead to antiproliferative effects on crypt epithelial cells [22].

Selenium, carotenoids, vitamin C and D have protective effects by scavenging free oxygen radicals in the colon [1].

Alcohol

More than 30gms of alcohol intake per day is associated with increased risk of developing rectal carcinoma [23].

Smoking

Smoking is associated with increased risk of developing rectal carcinoma especially when started at a young age, due to production of toxic polycyclic aromatic amine and induction of angiogenic mechanisms [24].

Post cholecystectomy

After cholecystectomy, free flow of bile into the colon occurs which is acted upon by bacteria and produces carcinogenic bile acid byproducts [1,3].

Hereditary factors

The relative risk of developing colorectal cancer is increased in the first degree relatives of the affected patients. For off-spring, the relative risk is 2.42. If more than one family member affected, the relative risk increases to 4.25.If the first degree family member is younger than 45 years at the time of diagnosis, the risk increase is even higher [29].

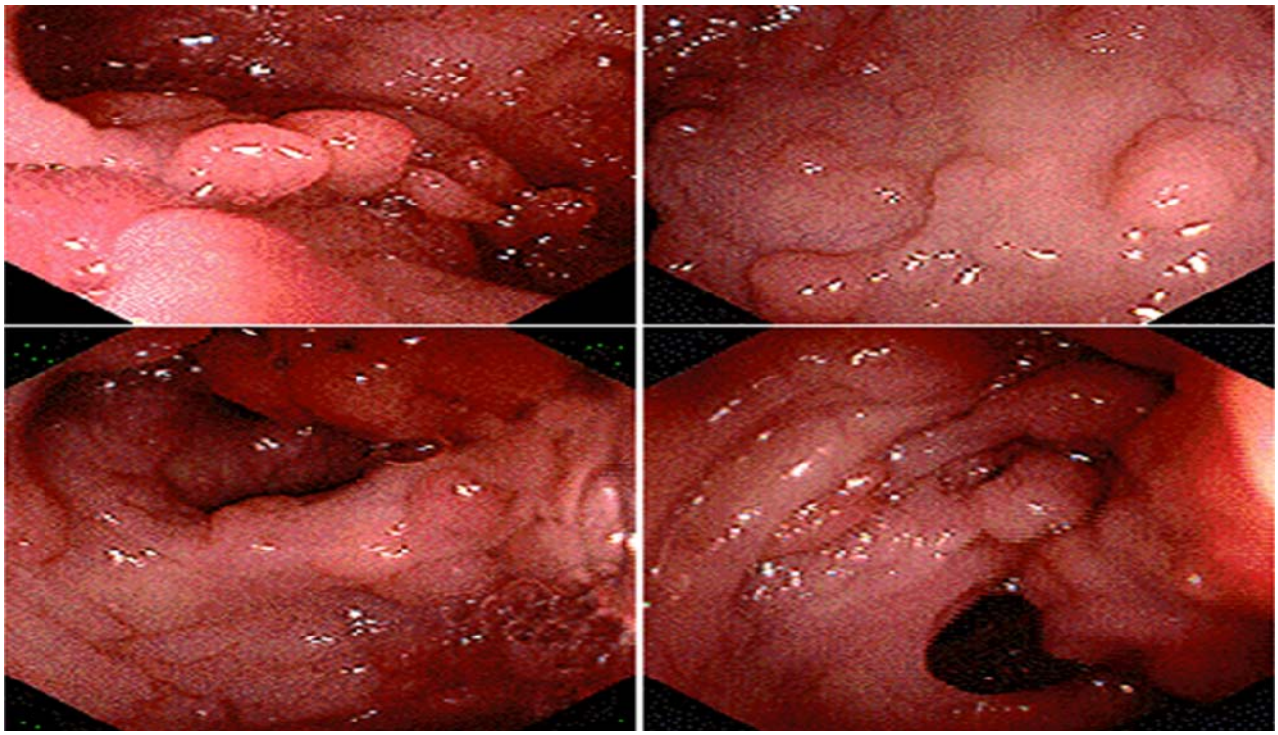
GENETIC FACTORS

Familial Adenomatosus Polyposis (FAP)

It is a autosomal dominant condition due to mutation in the APC gene located in chromosome 5q21, which results in the development of more than 100 adenomatous polyps. FAP is associated with osteomas of bone, desmoid tumors and brain tumors. If left untreated, carcinoma develops in nearly 100% of patients by the age of 40.

HNPCC

It is autosomal dominant condition due to mutation in mismatch repair genes located on chromosomes 2, 3 and 7. HNPCC have same number of polyps as general population. But they are more prone to develop malignancy. HNPCC associated with endometrial, thyroid, gastric and brain tumor.



COLONOSCOPIC VIEW OF FAMILIAL ADENOMATOSUS POLYPOSIS

Revised Amsterdam criteria

It is used to select at risk patients.

Criteria are

- 3 or more relatives who are diagnosed with an HNPCC associated cancer.
- One affected person is a first degree relative of the other 2.
- One or more cases are diagnosed before 50 years of age.
- At least 2 generations are affected.
- FAP has been excluded [11].

INFLAMMATORY BOWEL DISEASE

Chronic inflammation in IBD produces dysplastic changes which in turn increases risk of developing colorectal carcinoma. After 10 years of duration in patients with IBD, the incidence of colorectal cancer is 4-20 times greater than the general population.

IRRADIATION

Intracavitary irradiation in the treatment of carcinoma cervix is associated with increased risk of developing rectal carcinoma. It usually appears 5 to 15 years later.

HISTORY AND CLINICAL FEATURES

A complete history including family history and assessment of other risk factors are mandatory. Carcinoma rectum patients may be asymptomatic and discovered during DRE/ proctoscopic examination.

COMMON SYMPTOMS

Bleeding

Bleeding is the most common symptom, present in 60% of patients. Usually profuse bleeding and anemia are rare.

Change in bowel habits

Change in bowel habits is present in 43% of patients. Diarrhoea occurs particularly if the tumor has large villous component and in patients with growth in the ampulla of rectum. Constipation is common in annular lesion at pelvic rectal junction. Tumors in the lower 1/3rd of the rectum cause incomplete evacuation and tenesmus.

Occult bleeding

Occult bleeding present in 26% of cases which is detected by FOBT.

Abdominal pain

Abdominal pain present in 20% of cases.

Usually present in advanced growth in recto-sigmoid junction

Uncommon symptoms and signs

Back Pain is present when carcinoma invades / compresses sacral plexus present in 5% of cases.

Urinary symptoms - If invading / compressing the bladder / Prostate.

Bowel obstruction - In 9% of cases

Malaise - In 9% of cases.

Perforation - In 3% of cases

Jaundice - In liver metastasis patients - <1%.

Rectovaginal fistula

Supra clavicular lymph node enlargement

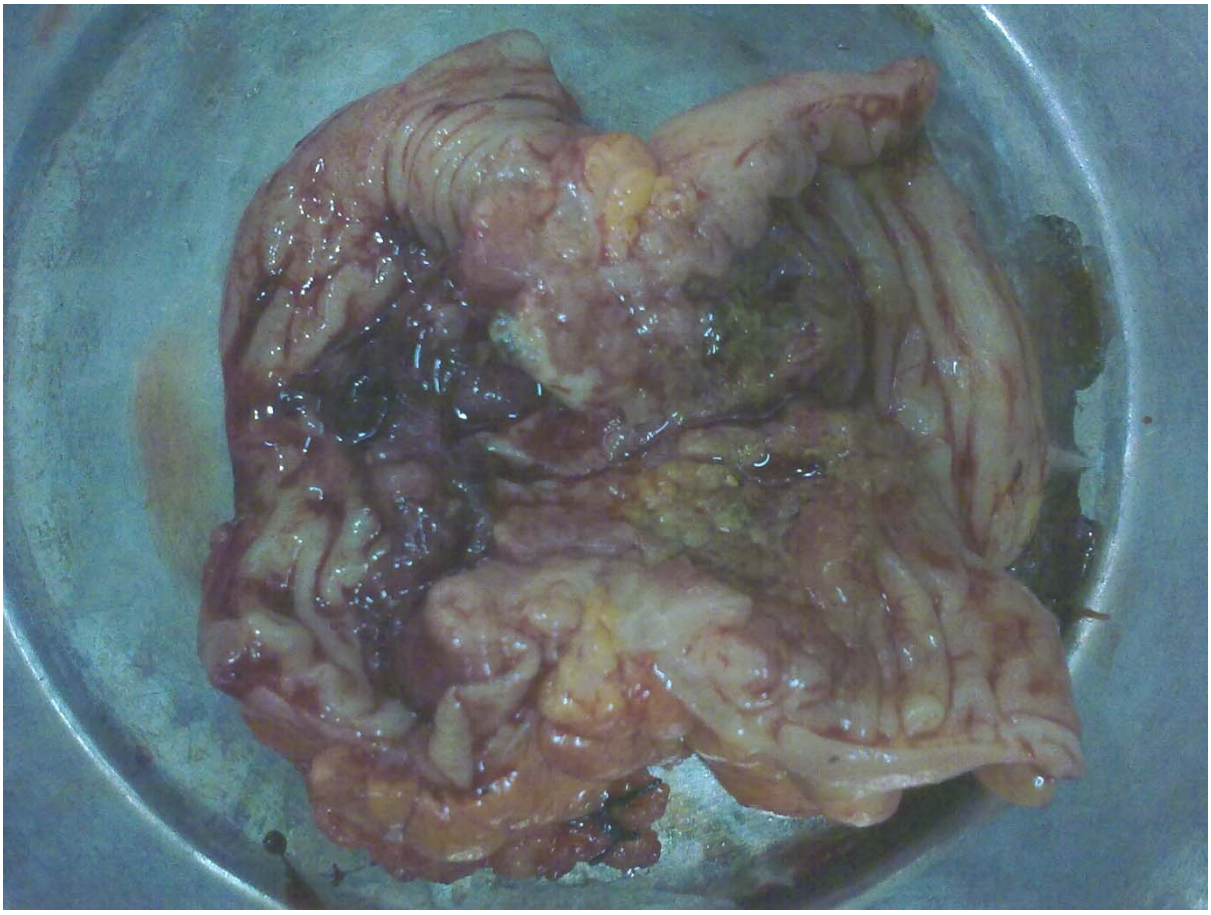
PATHOLOGY, STAGING AND PROGNOSIS

MACROSCOPIC APPEARNACE:

Macroscopically cancer rectum may be

1. Proliferative
2. Ulcerative
3. Annular
4. Diffusely infiltrating
5. Colloid

1. The proliferative type is the most frequently occurring one. It forms a fleshy bulky polypoid mass that bulges into the lumen of the bowel. It is a malignant adenoma of slow growth and of low order of malignancy and arises from the wall of the gut and forms a wide base. The proliferative growths are usually well differentiated adenocarcinoma.
2. Ulcerative growth present as a typical malignant lesion with raised irregular everted edges and a sloughing floor. It has tendency to infiltrate the bowel wall.



CUT SECTION OF ANNULAR GROWTH AT RECTO SIGMOID JUNCTION

3. The annular type of growth is seen typically in the upper 1/3 of the rectum. Small densely hard slow growing tumor that do not project into the rectum apparently but tends to encircle the gut wall and thus obstructing the passage of solid fecal matter.

4. Diffusely infiltrating carcinoma colon & rectum produces a diffuse thickening of the intestinal wall usually extending at least 5 to 8 mm and for the most part covered with mucosa but there is usually ulceration at some point. This form of carcinoma is sometimes found as an extension of one of the other gross type of the growth. It is also the infrequently the type of carcinoma that develops in ulcerative colitis.

5. Colloid carcinoma usually forms a bulky growth with very suggestive of gelatinous appearance. There may not be extensive ulceration and infiltration.

HISTOPATHOLOGICAL GRADING AND TYPING:

Grading depends upon subjective interpretation of the degree of differentiation at histological examination. Various grading systems have been proposed, but grading into two broad groups, low or average grade tumors which are well to moderately differentiated and high grade or undifferentiated induces the variation between observers while at the same time providing useful

prognostic information. Patients with high grade cancers have worse prognosis when compared with patients with well differentiated lesions after taking account of the tumor stage.

Typing on the other hand reflects the cellular characteristics. Mucinous, signet cell and small cell tumor are the variants of the more common adenocarcinoma .Signet cell and small cell tumors have a worse prognosis than adenocarcinoma, while mucinous lesions tend to recur locally. Both of these tumors are however more common in the anus. Other varieties are carcinoid and Leiomyosarcoma.

Histological features such as vascular, lymphatic or perineural invasion are prognostically unfavorable. By contrast lymphocytic infiltration of the tumor and a histolytic reaction in the regional lymph nodes are minor favorable prognostic features.

Identification of surface tumor antigens such as carcinoembryonic antigen, oncogene expression and DNA ploidy potential refinement but these are not yet in routine use.

STAGING OF TUMOR

Several staging methods are in use throughout the world, and each has its own strengths and weaknesses. The most commonly used are the Duke's

classification and derivations of it, or the Union international Cancer center (UICC) TNM classification. The former has the advantages of great simplicity but considerable disadvantages from lack of precision. It does not reflect accurately the depth of tumor penetration, the extent of spread outside the bowel, the number of lymph nodes affected by tumor or the presence or absence of metastasis, all of which have an important bearing upon prognosis. Derivations such as the Astler Coller and Australian classifications refine the Duke's staging but do not provide the flexibility of the TNM method, which enables useful division into subsets without being unduly complex. It is therefore most appropriate that surgeons adopt the TNM classification as a suitable international standard.

Staging gives information about prognosis in general, but particularly indicates the probability of occult hepatic metastases which is the major factor affecting survival. Patients with Dukes C tumor are more likely to have occult hepatic metastasis. Occult hepatic metastases account for the majority of deaths from colorectal cancer while only about 20% of patients die from local spread of the disease, which is also reflected, in the clinical stage.

1. Dukes classified carcinoma of the rectum into three stages.

Stage A: The growth is limited to the rectal wall

Stage B: The growth has extended to the extra rectal tissues but no metastasis to the regional lymph modes.

Stage C: There are secondary deposits in the regional lymph nodes [2].

ASTLER AND COLLER (1954):

Has made this classification more accurately in terms of prognosis

Stage A : Lesion limited to mucosa.

Stage B1 : Lesion penetrating muscularis propria but not through it.

Stage B2 : Lesion penetrating muscularis propria and extending into serosa.

Negative lymph nodes.

Stage C1 : Lesion involves all layers of bowel wall except serosa.

Positive lymph nodes

Stage C2 : Lesion involves all layers of the bowel walls including serosa.

Positive lymph nodes.

Stage D : Distant Metastasis

TNM Staging (1954)

By AJCC(American Joint Commission on Cancer) and IUAC(International Union against Cancer)

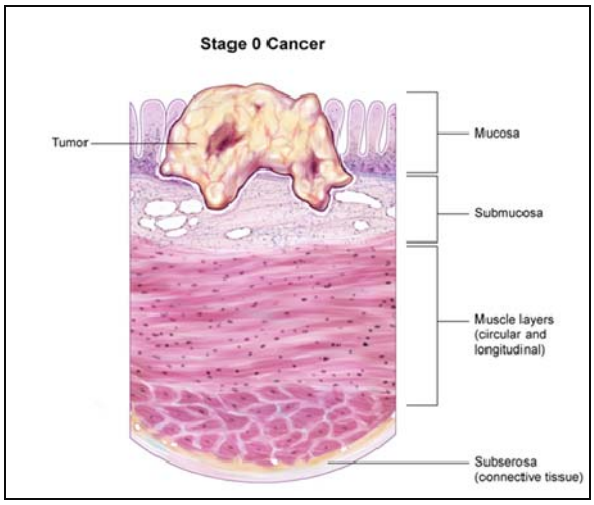
T - Staging

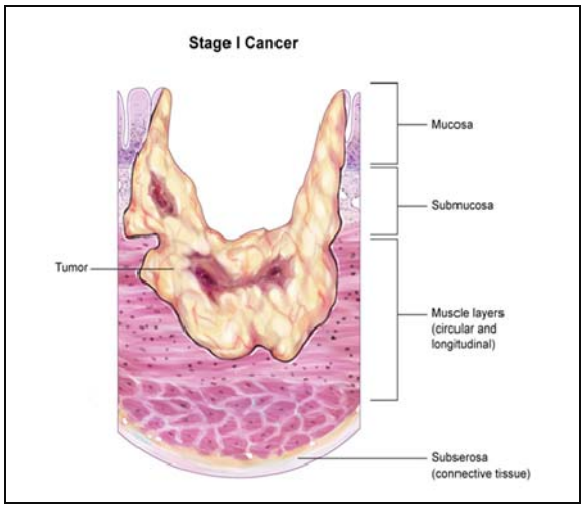
Tx	-	primary tumor could not be assessed.
T0	-	No evidence of primary tumor
Tis	-	Insitu – intraepithelial /invasion of the lamina propria.
T1	-	invades submucosa
T2	-	invades muscularis propria
T3	-	invades through muscularis propria into subserosa / into perirectal tissue
T4	-	invasion of adjacent organs

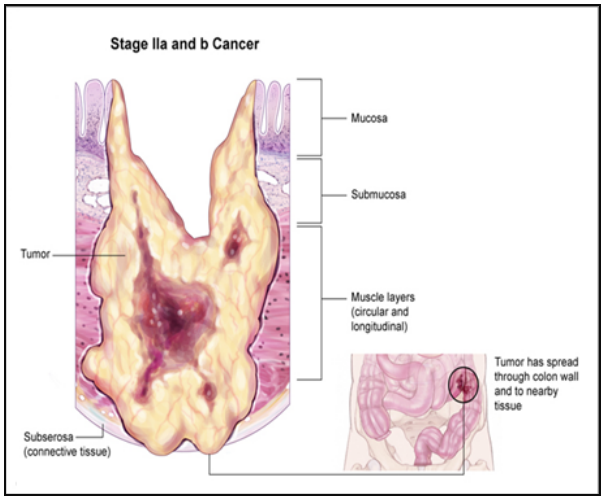
N – staging

Nx	-	Regional lymph nodes could not be assessed.
N0	-	No nodes
N1	-	Metastasis in 1-3 pericolic / perirectal lymph nodes
N2	-	Metastasis in 4/more pericolic / perirectal lymph nodes
N3	-	Metastasis in lymph nodes along the named vascular trunk

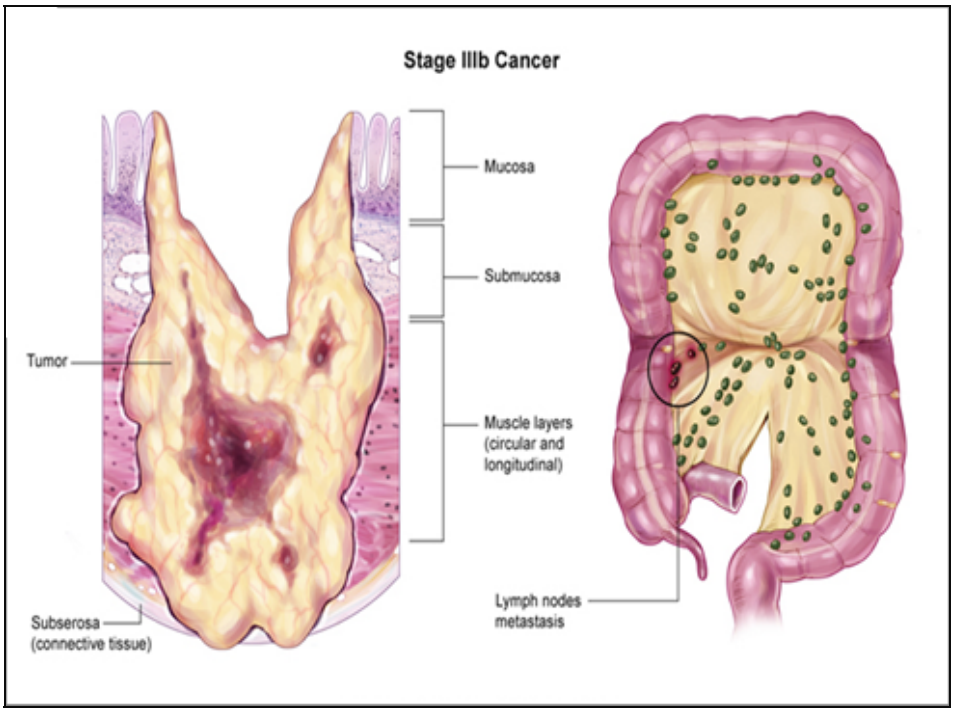
TNM STAGING OF CARCINOMA OF RECTUM

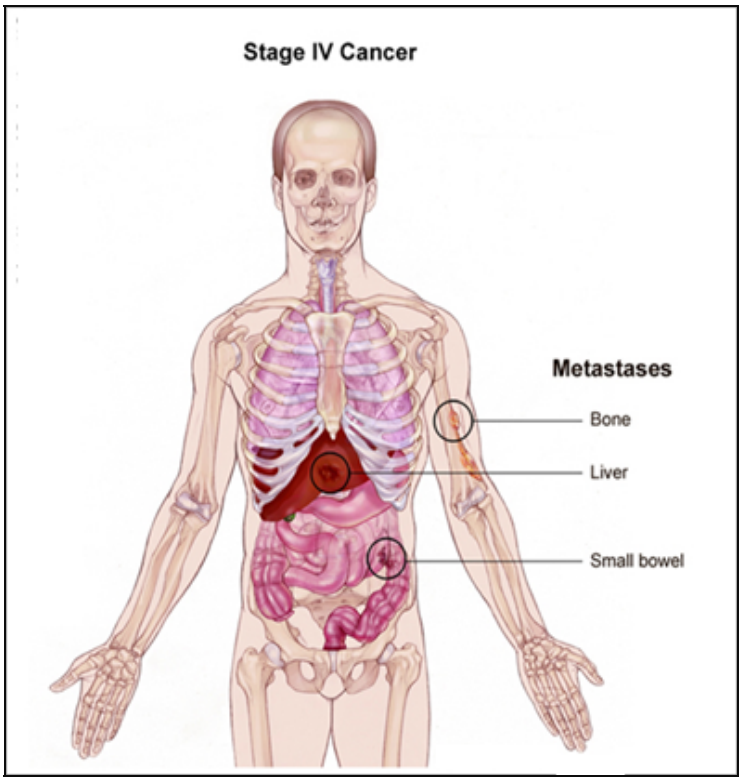






TNM STAGING OF CARCINOMA OF RECTUM





M – staging

Mx - Metastasis could not be assessed.

M0 - No distant metastasis

M1 - Distant metastasis

Comparison of TNM staging, Duke staging and 5 years survival rate

Stage I	T1-2 N0 M0	A	70-95%
Stage II A B	 T3 N0M0 T4 N0M0	B	54-65%
Stage III A B C	 T1-2 N1 M0 T3-4 N1 M0 T1-4 N2 M0	C	39-60%
Stage IV	T1-4 N0-2 M1	C	0-16%

PROGNOSIS

Stage remains the most important indicator of prognosis. The prognosis of patients with adequately treated Stage IV cancers is little different from that of an otherwise healthy population of the same age. 95 to 100% live 5 years or more after resection. Patients with cancer spread through the serosa only have a

40 to 60% chance of living 5 years, although the prognosis is more favorable if the tumor is only just through the serosa and is correspondingly worse if adjacent structures are invaded. Lymph node metastasis further adversely affects prognosis with only about 30% of patients surviving 5 years. Sub classification is useful. The survival curve of patients with colon and rectal cancer treated by resection is curvilinear, reaching a nearly flat plateau.

EVALUATION OF THE PATIENT

I. CLINICAL ASSESSMENT

Complete history including family history and assessment of risk factors are mandatory.

II. DIGITAL RECTAL EXAMINATION (DRE)

To assess size, location of the lesion from the anal verge, type of growth, fixity to surrounding structures and sphincter function especially if planned for sphincter sparing procedure.

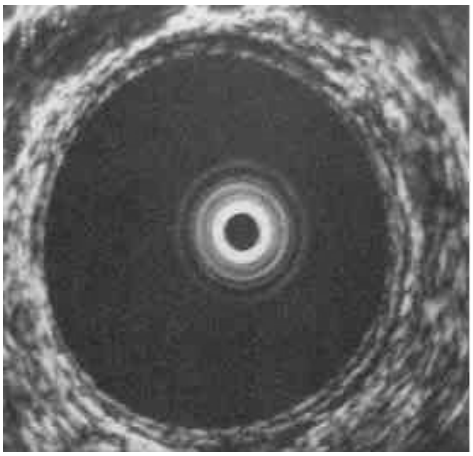
III. RIGID SIGMOIDOPROCTOSCOPY

It is useful for examination of the rectum and sigmoid colon. It is 25 cm in length and available in variable diameters. It can be performed without anesthesia. It allows direct visualization of the lesion, site, size of the lesion, degree of obstruction and is used to take biopsy, to assess ulceration and degree of fixation [1].

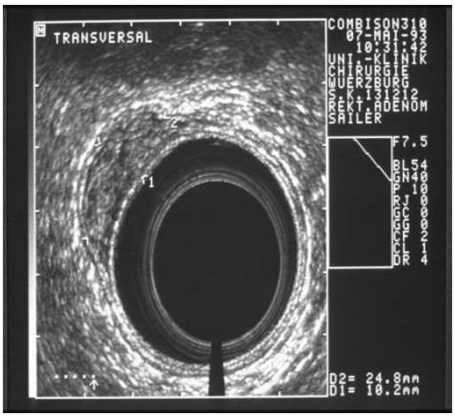
IV. FLEXIBLE SIGMOIDOSCOPY (FSIG)

Used to take biopsy. Flexible sigmoidoscopy leads to significant variability in assessing the level of rectal cancer and level of rectum itself. Therefore FSIG is not useful to determine the level of lesion.

ENDORECTAL USG SHOWING



Normal rectum

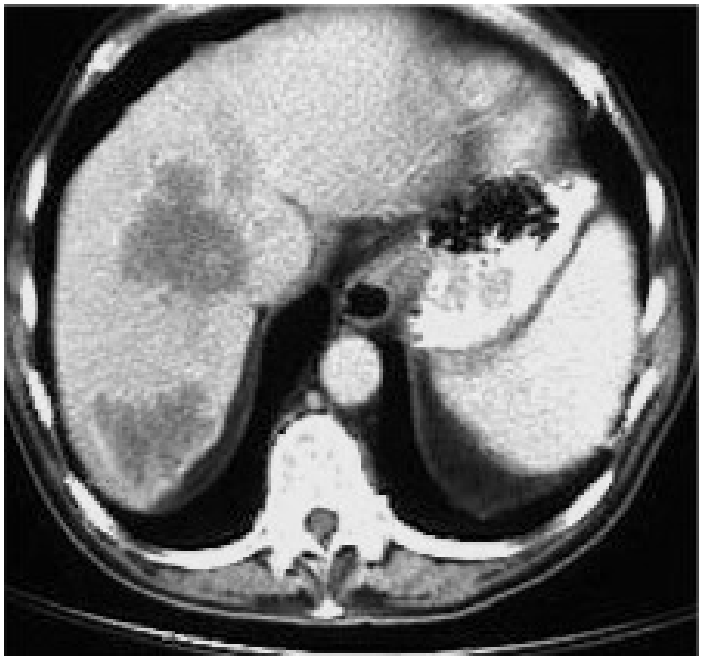


T1 lesion

T3 lesion

CT SHOWING

Circumferential wall thickening of rectum



Liver metastasis

V. ENDORECTAL USG

Endorectal USG primarily used to evaluate the depth of invasion. It can differentiate superficial T1, T2 from deeper T3, T4 lesion. Accuracy is 81 to 94%. It can detect perirectal lymphnodes also with accuracy rate of 58 to 83% and is also useful to detect early recurrence [1].

VI. CT ABDOMEN AND PELVIS

Used for staging colorectal carcinoma. Extravasation of contrast indicates perforation (or) anastomotic leakage. It is relatively insensitive for detection of the intraluminal lesions [1].

VII. MRI

It accurately determines the extent of spread of rectal cancer into mesorectum and pelvic wall [1].

VIII. PET SCAN

It is useful in detection of recurrent / metastatic colorectal carcinoma [1].

IX. DOUBLE CONTRAST BARIUM ENEMA (DCBE)

It is highly sensitive for detecting polyps more than 1 cm in diameter especially in proximal colon. But its efficacy in screening large population is not satisfactory. For screening, it is usually combined with FSIG.

Disadvantages of barium enema

1. Need for bowel preparation
2. Requirement of colonoscopy if a lesion is detected [1].

X. CT COLONOGRAPHY / VIRTUAL COLONOSCOPY

It was introduced in 1994. It is a high speed helical CT scanner with 3 dimensional view. Pre procedure bowel preparation is needed. It provides good visualization of entire colon including antegrade and retrograde views of flexures and haustral folds. If positive for lesion, colonscopy is required.

XI. FIBEROPTIC FLEXIBLE COLONOSCOPY (FFC)

It allows full visualization of entire colon. It detects synchronous lesions. It is possible to take biopsy from the lesion.

XII. OTHER TESTS

GUAIAC –FOBT

2 samples from each of 3 consecutive stools are tested. If any of 6 samples is positive, FFC is recommended.

Disadvantages

Occult blood from any part of the GIT produces positive test.

Red meat, vitamin C and some fruits also produces false positive results.

XIII. FAECAL IMMUNO CHEMICAL TEST (FIT)

This test is done by using monoclonal antibody against human haemoglobin. It is specific for lower GI bleed because, globin doesn't survive in the upper GI tract. Dietary restrictions are not necessary for this test. Any positive test recommends further colonoscopy.

XIV. STOOL DNA SCREENING TEST (SDNA)

Done by using polymerase chain reaction on sloughed mucosal cells in stool.

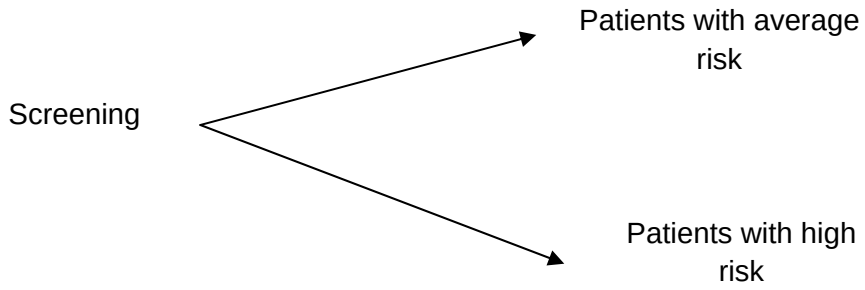
XV. TUMOR MARKERS

Carcinoembryonic antigen (CEA)

Baseline level of CEA is measured before surgery and follow up level is obtained after surgery. If CEA begins to rise in the postoperative period, it suggests possible recurrence. A CEA level of more than 100ng/ml indicates metastatic diseases and warrants thorough investigations.

SCREENING GUIDELINES

The purpose of the screening is to eradicate potential cancers while they are still in the benign stage of adenoma-carcinoma sequence. Screening also increases the likelihood of discovering existing cancer.



Patients with average risk for colorectal cancers

People who are asymptomatic and have no other risk factors.

Screening should begins at 50 years and end at 75 years [30].

Patients with High risk for colorectal cancers

Person with first degree relative affected by colorectal carcinoma.

Person with family history of FAP and HNPCC,

Person with personal history of adenomatous polyps

Person with personal history of colorectal cancer and IBD [1].

Category of population	Initial age	Recommended screening test
Average risk patients	50 years	Annual FOBT (or) Flexible sigmoidoscopy every 5 years (or) annual FOBT and flexible sigmoidoscopy every 5 years (or) DCBE every 5 years (or) colonoscopy every 10 years
Adenomatous polyps	50 years	Colonoscopy in first detection; then colonoscopy in 3 years; if no further polyps, colonoscopy every 5 years; if polyps present - colonoscopy every 3 years. Annual colonoscopy for more than 5 adenomatous polyps.
Colorectal cancer	At diagnosis	Pretreatment colonoscopy; then at 12 months after curable resection; then colonoscopy after 3 years, then colonoscopy every 5 years if no new lesions.
IBD	At diagnosis, then after 8 years of pancolitis, 15 yrs for L sided colitis	Colonoscopy with multiple biopsies every 1-2 years.
FAP	10-12 years	Annual flexible sigmoidoscopy and upper GI endoscopy every 1-3 years after polyps appear.
Attenuated FAP	20 years	Annual flexible sigmoidoscopy and upper GI endoscopy every 1-3 years after polyps appear.
HNPCC	20-25 years	Colonoscopy every 1-2 years, endometrial aspiration biopsy every 1-2 years.
Familial colorectal cancer first degree relative	40 years (or) 10 years before the age of the youngest affected relative	Colonoscopy every 5 years.

MANAGEMENT OF CARCINOMA RECTUM

Principle

Complete resection of primary tumor, its lymphatic bed and any other involved organ apply to surgical resection of rectal carcinoma. But, the anatomy of the pelvis and proximity of other structures (ureters, bladder, prostate, vagina, sacrum, iliac vessels) make resection more challenging and require a different approach than colonic adenocarcinoma and also obtaining negative radial margins in rectal cancers are also very difficult. Hence local recurrence is higher than with similar stage colon cancers. Paucity of small bowel and other radiosensitive structures in the pelvis makes it easier to treat rectal tumor with radiation. Therefore, therapeutic decisions are based upon the location, depth of the tumor and its relationship to other structures in the pelvis.

STAGE SPECIFIC THERAPY

Any rectal carcinoma patients should be evaluated by doing endorectal USG, MRI pelvis, CT abdomen and pelvis and colonoscopy. By using this, staging evaluation can be done.

Stage I (T1-T2 N0M0)

In high risk patients and patients accepting radical resection, radical procedures are done. In low risk patients and those not accepting the radical resections, local therapy such as transanal excision, transanal endoscopic surgery and endocavitatory irradiation are done. These patients are better treated with neo adjuvant or adjuvant chemoradiation [1].

Stage II (T3-4 N0 M0)

For managing stage II rectal carcinoma, there are two schools of thought. Advocates suggest that optimized operative technique (TME) will not need any adjuvant / neo adjuvant chemoradiation. Opponents suggest that, neo adjuvant / adjuvant chemoradiation will reduces local recurrence and prolong the survival[1].

Advantages of neo adjuvant chemoradiation

- Tumor shrinkage
- Downstaging the disease by treating locally involved lymphnodes
- Possibility of sphincter sparing procedure
- Improved resectability.

Disadvantages

- Poor wound healing
- Pelvic fibrosis
- Over treatment of early stage tumors

Post operative chemoradiation

It allows accurate pathologic staging of resected tumor and lymph nodes. It avoids poor wound healing.

Stage III (any T, Any N, M0)

Neoadjuvant chemoradiation

↓

Restage the tumor

↓

If no metastasis

↓

Radical resection [1].

Stage IV (Any T, Any N, M1)

Survival is limited in patients with distant metastasis. Isolated pulmonary/ hepatic metastasis is rare, if present may be resected for cure. Most patients require palliative procedures. Radical resection may be required to control pain, bleeding but highly morbid procedures such as pelvic exenteration

and sacrectomy generally should be avoided. Local therapy using intraluminal stents, cautery, endocavitory irradiation / laser ablation may be adequate to control bleeding / prevent obstruction [1].

OPERATIVE PRELIMINARIES

1. BOWEL PREPARATION

The rationale for bowel preparation is that decreasing the bacterial load in the colon and rectum, will decrease the incidence of post operative infections. The most commonly used regimens include polyethylene glycol (PEG) solutions and sodium phosphate solutions. PEG and sodium phosphate is equally efficacious in bowel preparation [1].

Disadvantages of PEG

1. Patient has to drink large volume
2. Bloating and nausea.

Disadvantages of sodium phosphate

1. Fluid and electrolyte abnormalities.

II. ANTIBIOTIC PROPHYLAXSIS

The addition of oral antibiotics to the preoperative mechanical bowel preparation is thought to decrease postoperative infection by further decreasing the bacterial load of the colon. A combination of three doses of neomycin (1 gm) and erythromycin (1 gm) is most commonly used. Metronidazole or ciprofloxacin may be used instead of erythromycin to avoid GI upset. A broad spectrum parenteral antibiotics should be administered just before the skin incision [1].

III. STOMA PLANNING

Preoperative stoma planning includes

- Counselling
- Education
- Stoma siting
- Evaluation of other medical condition that may impact a patient ability to manage a stoma (eyesight, manual dexterity)[1].

REVIEW OF VARIOUS SURGICAL MODALITIES

1. LOCAL SURGICAL PROCEDURES

a. Transanal excision

b. Transanal endoscopic microsurgery

c. Electrocautery / endocavitary irradiation

a. Transanal excision

Transanal excision is reserved for early stage cancers in a select group of patients. Criteria for Transanal excision

1. Lesion less than 3 cm in size.
2. Lesion occupying less than 1/3 of circumference of rectum.
3. Exophytic / polypoidal growth
4. Low grade tumors (well differentiated)
5. Tumors located within 8 cm of anal verge
6. T1 lesions
7. T2 in select groups [31,32].

The lesion is excised fully with 1 cm margin of normal tissue and leaving defect closed.

Positive resected margin, lymphovascular invasion, lymphnode metastasis in post operative histopathological examination mandate further radical procedures[32].

b. Transanal endoscopic microsurgery

It is another form of local excision by using special operating proctoscope that distends the rectum with, insuffalated Co2 and allows the passage of dissecting instruments.

This method can be used on lesions located higher in the rectum, even in the distal sigmoid colon.

c. Endocavitary irradiation

The selection criteria for this procedure are similar to those for TNA. Endocavitary irradiation is delivered by a special proctoscope. A total of 6 application of high dose (20 Gy to 80 Gy) low voltage irradiation 50 KV is given over the course of 6 weeks [32].

2. ANTERIOR RESECTION

It is the resection of rectum from an abdominal approach to the pelvis, without need for a perineal / sacral incision.

Three types

a. High anterior resection – Done for upper 1/3rd lesions

b. Low anterior resection – Done for middle 1/3rd lesions

c. Extended low anterior resection – Done for lower 1/3rd lesions

In high and low anterior resection continuity is restored by colorectal anastomosis. In extended low anterior resection continuity is restored by coloanal anastomosis.

The coloanal anastomosis is done either by straight tube coloanal anastomosis or creation of colonic 'J' pouch anal anastomosis.

The anastomosis is done by either handsewn technique or with stapling device.

The acceptable distal and proximal resected margins for rectal cancer[26].

Resection margin	**Proximal resection margin in cm**	**Distal resection margin in cm**
Ideal margin	5 cm/more	2 cm/more
Minimally acceptable margin	5 cm/more	1 cm/more

CIRCULAR STAPLING INSTRUMENT

SCHEMATIC REPRESENTATION OF STAPLING TECHNIQUE

Transmesorectal excision (TME)

Transmesorectal excision is a technique that uses sharp dissection along the anatomic planes to ensure complete resection of rectal mesentery during low and extended low anterior resections. For upper rectal / rectosigmoid resection, a partial mesorectal excision of atleast 5 cm. distal to the tumor appears adequate. Transmeorectal excision decreases both local recurrence rate and improves long term survival rates.

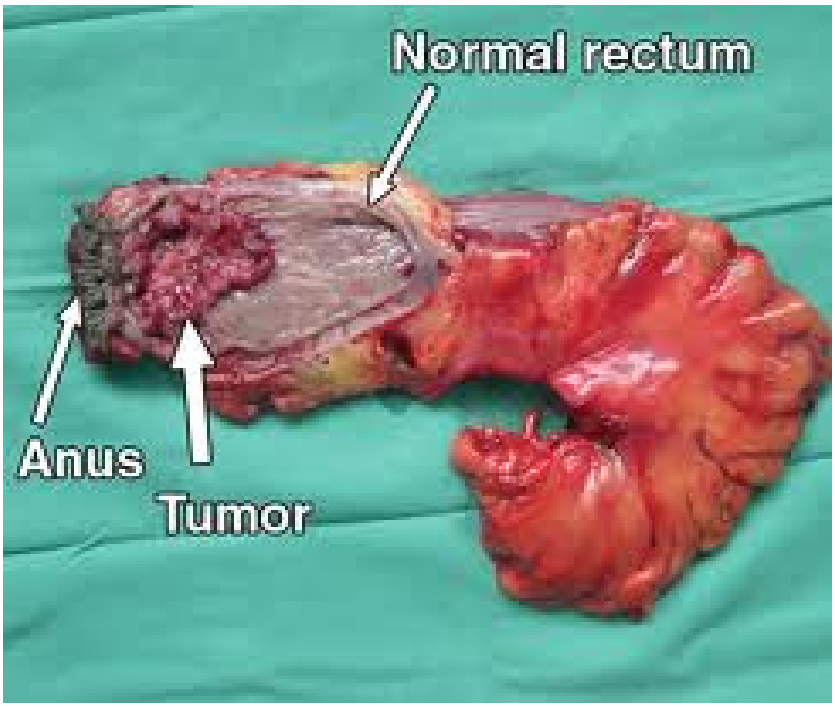
Principles of TME should be applied to all radical resection of rectal cancer.

3. ABDOMINO PERINEAL RESECTION (APR)

APR is performed with lower 1/3rd rectal cancers. APR involves removal of the entire rectum, the anal canal and anus with construction of permanent colostomy from the descending / sigmoid colon.

Two team approaches is used. The abdominal team mobilizes the colon and rectum, transect the colon proximally and creates an end sigmoid colostomy. The perineal team begins by closing the anus by purse string sutures. The perineal team is designed to excise the anal canal with wide circumferential margin. The perineal wound is closed after keeping a closed suction drain.

LOW ANTERIOR RESECTION - SPECIMEN



APR - SPECIMEN

4. LAPROSCOPIC ASSISTED APR

Mobilisation of sigmoid colon, rectum is done through laproscopy and perineal resection is done by usual open method.

5. POSTERIOR RESECTION

a. Trans sacral

b. Trans sphincteric

Trans sacral – Kraske's

For middle one third rectal lesions. Coccyx and lower 2 segments of sacrum excised. There will be increased risk of fecal fistula.

Trans sphincteric – York Mason's

No sacrectomy needed. Sphincteric complex carefully delineated, divided and re approximated. Decreased risk of fecal fistula, but increased risk of incontinence present.

RADIATION THERAPY

A multidisciplinary approach that includes, colorectal surgery, medical oncology and radiation oncology is required for optimal treatment of rectal carcinoma. Although radical resection of rectum is the main stay of therapy,

surgery alone has high recurrence rate (30-50%). So, adjuvant radiation therapy is advocated.

Radiation therapy can be delivered

- Preoperatively / neo adjuvant
- Intra operatively
- Post operatively

NEO ADJUVANT /PREOPERATIVE RADIATION THERAPY

Advantages

- Tumor shrinkage
- Down staging of the disease
- Improved resectability
- Possible of sphincter sparing procedures
- Minimizes the radiation exposure to small intestines due to pelvic displacement and adhesions following surgery.
- Radiation therapy is also effective, if given preoperatively because cells are well oxygenated before surgery. Post operatively cells are relatively hypoxic and resistant to radiotherapy [7, 28].

Disadvantages

- Poor wound healing
- Anastomotic leak
- Delay in starting definitive treatment
- Loss of accurate pathological staging
- Possibility of over treatment of early stage I and II carcinomas.

INTRAOPERATIVE RADIATION THERAPY

It is recommended in patients with large bulky fixed, unresectable tumors. It requires specialized, expensive operative room with equipment, limiting its use.

POST OPERATIVE ADJUVANT RADIATION THERAPY

Advantages

- Immediate definitive resection
- Accurate pathological staging can be done.
- No preoperative radiation therapy induced morbidity.

Disadvantages

- Delay in adjuvant radiation therapy if postoperative complications ensue.
- No effect on tumor cell spread at the time of surgery.
- Decreased effect of radiation in tissues with surgically induced hypoxia.

CHEMOTHERAPY

Chemotherapy options for colon and rectal cancers have greatly expanded in recent years. The most useful drug for colorectal carcinoma is 5FU. 5FU is a fluorinated pyrimidine, which blocks the formation of thymidilic acid and DNA synthesis. It offers good radiosensitization without severe side effects. 5FU has been used in conjunction with radiation (combined modality) therapy before surgery (neo adjuvant) as well as after surgery.

Stage I and II rectal cancers with radical surgery do not require adjuvant therapy. High risk patients including those with poorly differentiated tumor histology and those with lymphovascular invasion should be considered for adjuvant chemoradiation.

Stage III and IV (Locally advanced tumors) All patients should receive neo adjuvant chemoradiation which improves local control, distant spread and survival.

Regimens used in stage III and IV disease include:

FOLFOX (Folinic acid, 5 FU, Oxaliplatin)

FOLFIRI (Folinic acid, 5FU, Irinotecan)

In recent randomized phase III studies, panitumumab, a monoclonal antibody for EGFR, combined with FOLFOX or FOLFIRI significantly improved progression free survival when compared to FOLFOX or FOLFIRI alone in patients with metastatic colorectal cancer and wild type Kras status[33,34].

COMMON REGIMENS

FOLFOX (every 2 wks)

Oxaliplatin 85 mg/m^2 Day 1

Leucovarin 200mg/m^2 Day 1

5FU 400 mg/m^2 IV Bolus Day 1 and 2

5FU 600mg/m^2 IV Infusion Day 1 and 2 Over 22 hours.

FOLFOX 4 (every 2 wks, 4 cycles)

Oxaliplatin 85 mg/m^2 Day 1

Leucovarin 200mg/m^2 Day 1

5FU 400 mg/m^2 IV Bolus Day 1 and 2

5FU 2400mg/m^2 IV Infusion Day 1 (46 hours)

FOLFIRI (every 2 wks)

Irinotecan 165 mg/m^2 Day 1

Leucovarin 200mg/m^2 Day 1

5FU 400 mg/m^2 IV Bolus Day 1 and 2

5FU 600mg/m^2 IV Infusion Day 1 & 2 (over 22 hours)

FOLFOXIRI (every 2 wks)

Irinotecan 180 mg/m^2 Day 1

Oxaliplatin 85 mg/m^2 Day 1

Leucovarin 200mg/m^2 Day 1

5FU 3200mg/m^2 IV Infusion Day 1 (48 hours)

MANAGEMENT OF RECURRENT AND METASTATIC CARCINOMA

Surveillance should be early and most intensive, because recurrent disease develops within the first 2 years after primary resection in about 80% of patients.

LOCAL RECURRENCE:

Recurrent carcinoma may present as a localized tumor at the anastomosis or more commonly as recurrent disease in the bed of the primary carcinoma growing into the. anastomotic area. The disease may be extensive and may involve regional lymph nodes.

Surgery is the only hope for cure in these patients but frequently the extent and dissemination of the disease make complete excision impossible. In symptomatic patients, however maximal palliation can be accomplished by alternative surgical treatments such as resection, fecal diversion or a bypass procedure. Local palliation may be accomplished by transanal laser surgery or fulguration in patients with disseminated disease or in poor medical condition. More extensive operations including sacral resection or pelvic exenteration are reserved for patients with isolated recurrent disease who are in excellent medical condition.

LIVER METASTASIS:

Colorectal carcinoma will metastasize to the liver in about 35% of patients. Half of these patients will have liver metastases at the time of primary resection of the colon.

At present hepatic resection is the only curative treatment available for these patients. The median survival from the time of diagnosis of metastatic liver disease is about 4 to 12 months for unselected groups whereas 45% of patients with a solitary metastatic lesion may be alive at 2 years and 12% may be alive at 3 years. In the absence of resection however survival longer than 5 years is almost never possible.

The Grade of the tumor may have some influence on the survival of patients with untreated liver metastases. In the series by (Goslin et al) the median survival time for patients with well, moderately well and poorly differentiated tumor was 30, 16 and 6 months respectively [35]. However the relation between the histological findings and the extent of involvement of the liver was not reported.

BLOOD TRANSFUSION:

Blood transfusion has been alleged to affect survival after resection of primary colorectal carcinoma. Similarly perioperative blood transfusion has

been found to be an independent prognostic factor adversely affecting survival after resection of liver metastases. Specifically, for each additional unit of blood, death increased by 5% and 7% respectively. Further studies are directed toward decreasing blood loss during hepatic resection to minimize the need for blood transfusions.

At laparotomy for resection of colorectal carcinoma 10% to 26% of patients will have synchronous liver metastases. Usually, simultaneous liver resection has been performed with good results however is safe when patients with liver as a solitary metastastic lesion that can be removed by limited resection minimal blood loss or contamination in an uncomplicated status that would permit both procedures and a surgeon who is comfortable in proceeding with the resection. No survival advantages exist performing simultaneous versus delayed resection of the liver.

UNRESECTABLE METASTASIS:

Liver transplantation for patients with unresectable hepatic disease has been reported in Europe. Because of the shortage of donor organs and the lack of long term follow-up studies transplantation is not likely to be a feasible alternative for the treatment of patients with metastatic disease.

Alternative methods of treatment including the use of monoclonal antibodies and hepatic cryosurgery are under investigation may prove to be of considerable benefit in the future.

PULMONARY METASTASIS:

It is estimated that pulmonary metastases will develop in about 10% of patients with colorectal carcinoma at some time in the course of the disease. By that time in most patients disease will already have spread to other organs. Only 10% of these patients will actually have a solitary pulmonary metastatic lesion.

The only hope of cure for patients with pulmonary metastases from colorectal carcinoma is resection. In a collective review by Brister et al, the survival rate of 335 patients in 12 series who underwent resection of pulmonary metastases form colorectal carcinoma was 70% at 2 years and 30% at 5 years[36]. Clearly resection should be undertaken whenever a recurrent lesion limited to the lung is technically resectable.

BRAIN METASTASIS:

Carcinoma metastatic to the brain from a colorectal primary site is uncommon and is usually associated with disease elsewhere particularly in the lung. Metastatic carcinoma of the brain is usually diagnosed because of the presence of neurologic symptoms rather than during screening. Radiation

provides the best palliation without increased morbidity. At the same time, in the rare situation of a patient whose metastatic lesion in the brain is the only site of recurrence craniotomy may prolong the survival.

OSSEOUS METASTASIS:

The incidence of bone metastasis among patients with disseminated colorectal carcinoma varies among different series. Osseous metastases which are uncommon may be the source of considerable pain. The diagnosis is usually achieved with bone scans. Palliative treatment by means of radiation is usually effective.

OVARIAN METASTASIS:

The ovary is the site of metastatic diseases in 3% to 8% of women with colorectal carcinoma. Metachronous ovarian metastases cause considerable morbidity and overall are associated with poor survival. Patients with ovarian metastases of colorectal origin should undergo aggressive surgical therapy. Bilateral oophorectomy should be performed even in patients with unilateral ovarian involvement. Some authors recommended prophylactic bilateral oopherectomy as part of the initial surgical treatment for colorectal carcinoma in premenopausal women with advanced stages of disease and in all postmenopausal women.

MATERIALS AND METHODS

This study has been conducted in the Department of Surgery, Govt. Rajaji Hospital, Madurai during 2009-2011. Patients admitted in general surgery units, surgical gastroenterology and surgical oncology department were selected. All patients were subjected to detailed history, thorough clinical examination of the abdomen, digital rectal examination, proctoscopy and biopsy was taken for histopathological examination.

All these patient had base line biochemical investigations done including blood-Hb%, TC, DC, Blood Sugar, Blood Urea, Serum Creatinine, Urine-sugar, albumin, microscopy, liver function test, ultrasonography, double contrast barium enema when warranted, CT abdomen and pelvis plain and contrast, Magnetic Resonance Imaging when feasible.

All patients were counseled with regards to treatment side effects, possible outcome with and without the preoperative chemoradiotherapy, the side effects during the course. The patients were counseled with regard to colostomy. During the counseling session a previous ostomate was included.

Patients were staged according to the TNM classification system using clinical and radiological data. Patients those who were included in neo adjuvant chemoradiation were investigated thoroughly and underwent

radiotherapy 45-60 Gy in 150-200 cGy fractions for 5 days a week and concurrent 5-FU 10mg/kg and leucovorin 30mg infusion every 21 days for 6 cycles was given. They were again restaged clinically and radiologically.

Preoperative bowel preparation with polyethylene glycol and intravenous antibiotics was given to all patients. Postoperatively patients were followed up. Postoperative adjuvant chemotherapy was given to most of the patients with 5-FU 500mg given for the first 3 days of every fortnight for 6 months along with leucovorin. Majority of the patients were regularly followed up for one year. All these data were recorded in a proforma.

RESULTS

TABLE 1: Age distribution

Age in years	Male	Female	Total	Percentage
20-30	2	1	3	6%
31- 40	5	5	10	20%
41-50	8	4	12	24%
51-60	10	4	14	28%
61-70	8	2	10	20%
71-80	1	0	1	2%

Out of 50 cases, in our study most number of the carcinoma rectum cases occurs in 5th decade (28%). Incidence started to increase from 3rd decade reaches peak at 5thdecade, then again fall after 6th decade. Usually the incidence is rising steadily after the age of 50 and more than 90% of cases diagnosed are in people older than 50 years of age [1]. But in our study equal distribution of cases observed before and after 50 years of age and in cidence started to rise after 30 years of age. Among males maximum number of cases occurs between 4th and 6th decade, and in females between 3rd and 5th decade i.e. in

females carcinoma rectum occurs one decade earlier than males in our study. Mean age of incidence is 50.4 in our study.

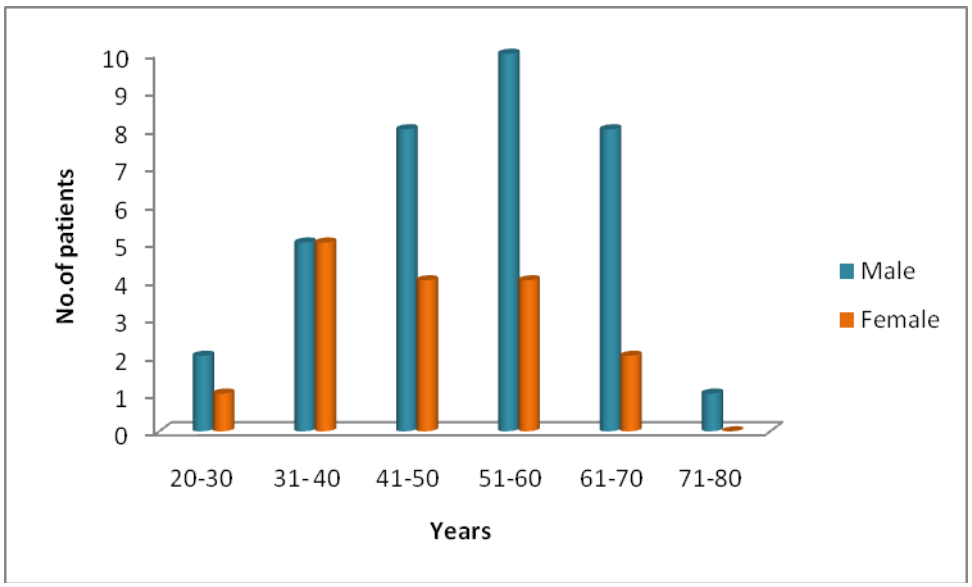


Fig1. Age distribution in Males & Females

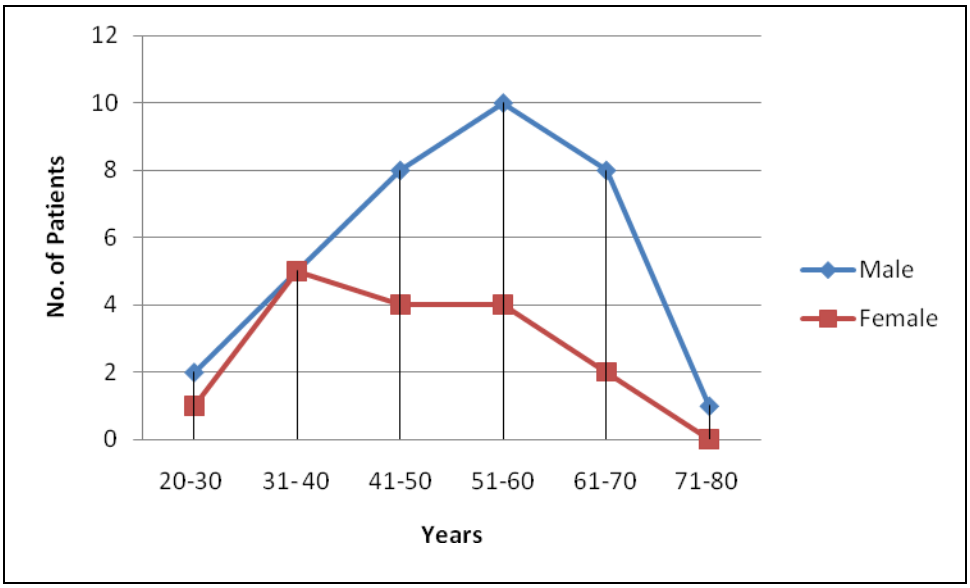


Fig 2. Age distribution in Males & Females

Sex distribution

Total number of cases in our study	-	50
Total number of male patients	-	34(68%)
Total number of female patients	-	16(32%)
Male to female ratio	-	2:1

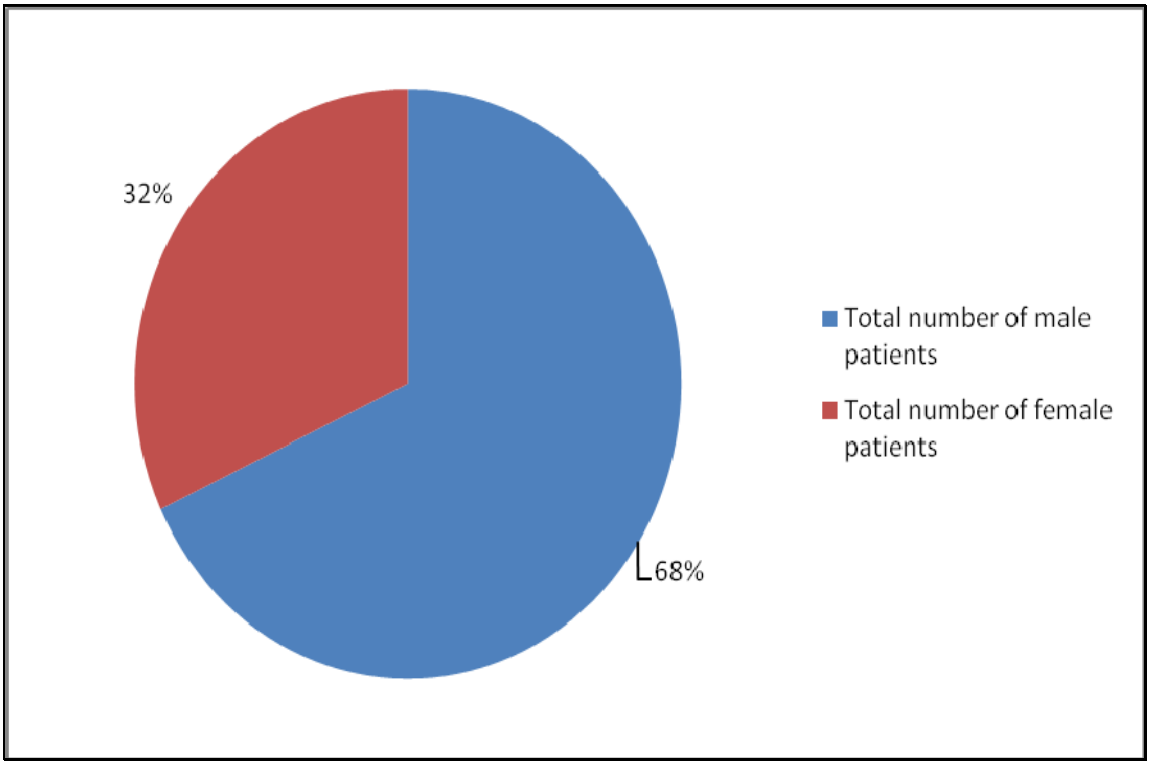


Fig 3. Sex distribution

TABLE 2: Symptoms

Symptoms	No. of patients	Percentage
Bleeding per rectum	38/50	76
Constipation	29/50	58
Pain	12/50	24
Tenesmus	14/50	28
Diarrhoea	6/50	12
Acute intestinal obstruction	8/50	16

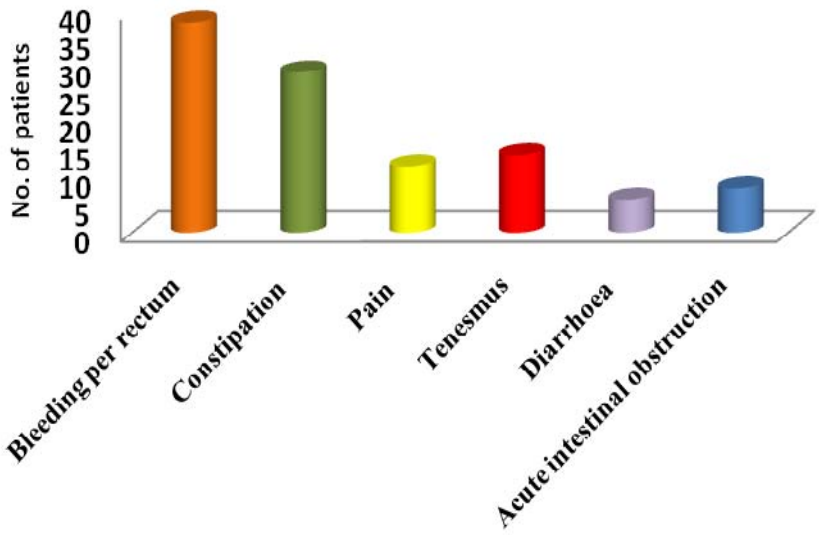


Fig 4. Symptoms

TABLE 3: Site of lesion

Site of lesion	No. of patients	Percentage
Upper 1/3rd	6	12
Middle 1/3rd	17	34
Lower 1/3rd	27	54

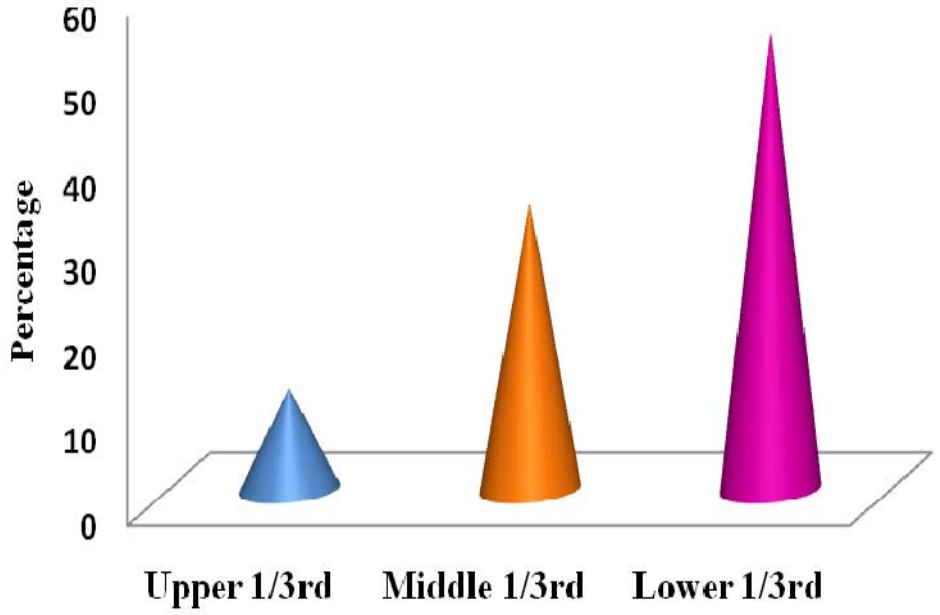


Fig 5. Site of lesion

TABLE 4: Stage of the disease

Stage	No. of patients	Percentage
Stage I & II	18	36
Stage III	24	48
Stage IV	4	8
Staging not done	4	8

Two cases that presented as acute intestinal obstruction did not turn up after loop colostomy. One case expired during postoperative period following loop colostomy. Another case was not affordable for doing investigations.

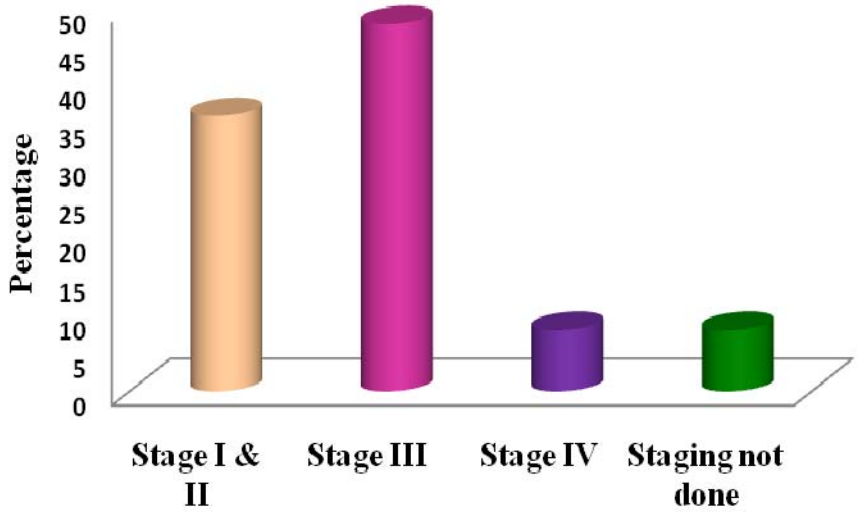


Fig 6. Stage of the disease

TABLE 5: Adjacent organ involvement

Adjacent organ involvement	No. of patients	Percentage
Bladder infiltration	2	4
Sacral infiltration	1	2
Vaginal infiltration	1	2
Prostate & bladder infiltration	1	2

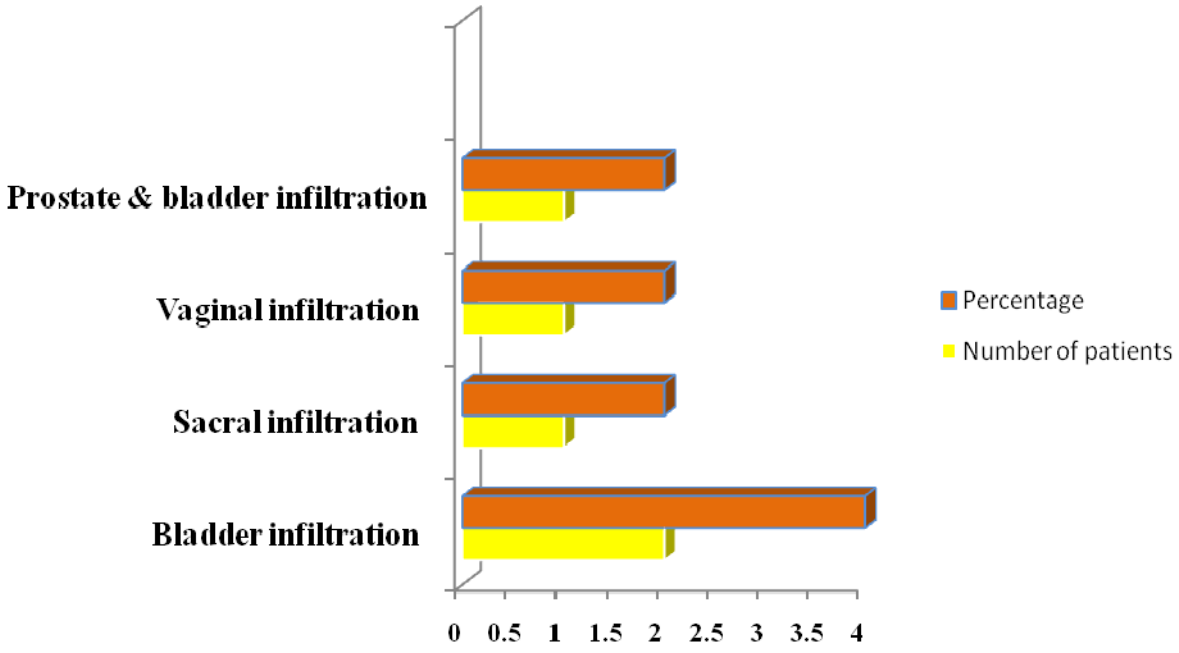


Fig 7. Adjacent organ involvement

TABLE 6: Distant metastasis

Distant metastasis	No. of patients
Liver metastasis alone	3
Liver metastasis and ascites	1

TABLE 7: Surgeries

Surgeries	No. of patients	Percentage
Abdomino Perineal Resection	20/45	44
Lap. APR	10/45	22
AR	7/45	16
Loop colostomy	8/45	18
Inoperable	5	

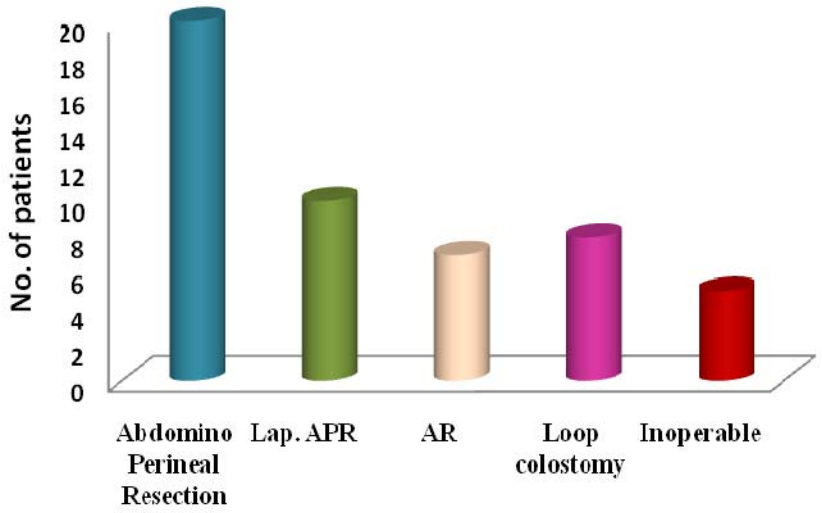


Fig 8. Surgeries

TABLE 8: Postoperative morbidity

Postoperative morbidity	No. of patients	Percentage
Perineal wound infection	5/30	16.6
Perineal wound gaping	1/30	3.3
Abdominal wall infection	1/45	2.2
Retention of urine	2/45	4.4
Impotence	1/45	2.2

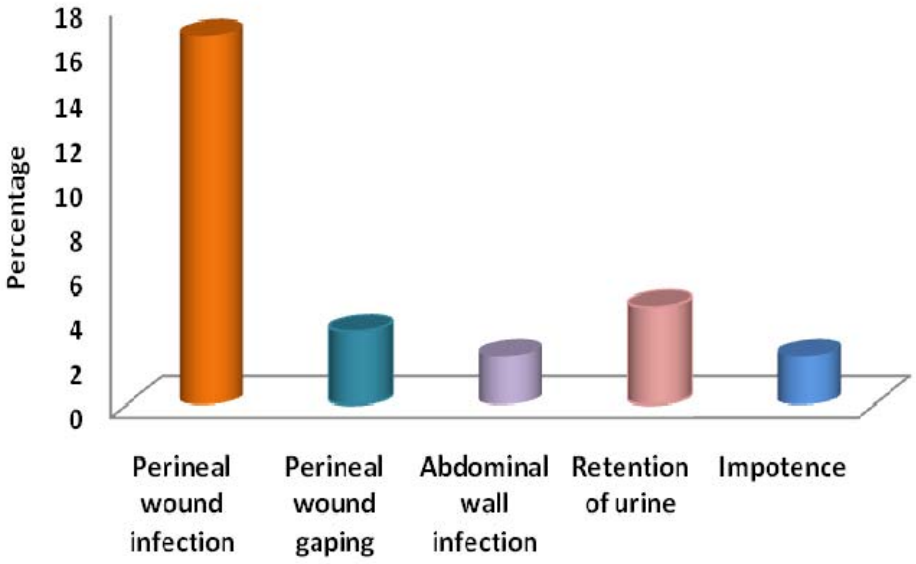


Fig 9. Postoperative morbidity

TABLE 9: Postoperative mortality

Postoperative mortality	No. of patients	Percentage
	1/45	2.2

Neo Adjuvant chemoradiation

Neo adjuvant chemoradiation therapy was given for five stage III diseases. Among the 5 cases, anterior resection was done for three cases and APR was done for two cases. Out of the 5 patients, one patient developed perineal wound gaping and two patients developed perineal wound infection.

DISCUSSION

Rectal malignancy is one among the common malignancies presenting at Government Rajaji Hospital, Madurai.

Age Distribution

In our study most number of carcinoma rectum cases occurs in 5th decade (28%). Incidence started to increase from 3rd decade, reaches peak at 5th decade, then again fall after 6th decade. Usually the incidence is rising steadily after the age of 50 and more than 90% of cases diagnosed are in people older than 50 years of age [1]. But in our study equal distribution of cases observed before and after 50 years of age and incidence started to rise after 30 years of age. Among males maximum number of cases occurs between 4th and 6th decade, and in females between 3rd and 5th decade- i.e. in females carcinoma rectum occurs one decade earlier than males in our study. The mean age of incidence in our study is 50.4. Deo S Kumar et al reported the mean age of incidence as 45.4 years in their study [17]. The incidence of rectal cancer in young patients i.e. between 20-30 years is usually rare. In our study the incidence of carcinoma rectum in patients aged between 20-30 years is 6% which coincided with an incidence of 5% in Ashutosh Mukerji et al study [18].

Sex Distribution

In our study, out of 50 patients, 34 patients (68%) were male and 16 patients (32%) were female with male predominance with the ratio of 2:1. But Stein W et al reported the incidence of colorectal cancers in females as 53% [13]. This huge variation in sex distribution pattern may be due to geographical variation and inclusion of other colonic malignancies in their study.

Symptoms

The most predominant symptom in our study was bleeding per rectum which constitutes 76%. The next predominant symptom was constipation in 58% of patients. Pain was present in 24% of cases. This pattern of symptomatology coincided with Kyle SM et al study [14]. In our study, 16% of patients presented with acute intestinal obstruction in contrast with Kyle SM et al study which showed a 23% occurrence[14]. The median duration of symptoms prior to the diagnosis was 70 days in our study. Kyle SM et al reported the same as 90 days [14]. There is no correlation existing between tumor stage and duration of symptoms in our study.

Site of involvement

Commonest site of involvement was lower 1/3rd of rectum of about 54%. Involvement in middle 1/3rd of rectum was 34%. Involvement in the upper 1/3rd was the least with 12%. Deo S Kumar et al also reported a similar distribution of site of involvement [17].

Staging of the disease

The staging of the disease was done by using ultrasound abdomen pelvis, CT abdomen and pelvis and MRI if feasible. In our study, most of the patients were in stage III (T1-4 N1-3 M0) which constitutes 48%. 36% of patients were in stage I and stage II. 8% of patients came under stage IV because of their metastatic involvement in liver. In our study staging could not be done in 4 cases. Because two cases presented as acute intestinal obstruction did not turn up after loop colostomy. One case expired during post operative period following loop colostomy in the 4th post operative day and another case could not afford investigations. Stein W et al reported Stage I and II (Duke's A &B) in 52% of cases, Stage III and IV (Duke's C & D) in 48% of cases [13]. In our study, patients under stage I and II was 36% as against 52% in their study. Patients under Stage III and IV were 56% as against 48%. This difference may be due to lack of screening program and lack of awareness of disease symptoms among patients.

Surgery

20 patients underwent abdomino perineal resection (44%), 10 patients underwent laproscopic assisted abdomino perineal resection (22%), 7 patients were underwent anterior resection (16%).

8 patients were presented with acute intestinal obstruction and they underwent emergency loop colostomy.

5 patients were inoperable for whom palliative chemotherapy / radiotherapy was given. Deo S Kumar et al reported 75% of the patients underwent curative resection with abdominoperineal resection in contrast with 66% in our study [17]. They did not mention about sphincter preserving surgeries. We did anterior resection in 16% of patients. Totally 82% of patients with carcinoma rectum underwent curative resection in our study.

Morbidity

The most common post operative morbidity in our study was perineal wound infection in 16.6% of patients. Perineal wound gaping was present in 3.3% of cases. Abdominal wound infection was present in 2.2% cases. Both perineal wound infection and abdominal wound infection was treated with appropriate antibiotics and dressing after obtaining pus culture and sensitivity. Perineal wound gaping healed by proper wound care. Retention of urine was

present in 2 patients and impotence was reported 1 patient. The overall morbidity rate was 28.7%. Both Deo S Kumar et al and Bogdan C Paun et al reported the overall morbidity rate in their studies as 23% and 20% respectively[17,19]. The slight increase in morbidity rate in our study emphasized to focus on quality improvement in pre-, intra-, and post operative efforts.

Mortality

2 cases expired in our study. One case which presented with liver metastases with liver failure expired before starting any palliative therapy. Another patient was admitted with acute intestinal obstruction with perforation. Emergency loop colostomy was done. He expired on IVth postoperative day due to multi organ failure and septicemia. Both Deo S Kumar et al and Bogdan C Paun et al reported the post operative mortality in their study as 2% which coincides with our study (2.2%) [17,19].

Neo adjuvant chemoradiation

In our study, neo adjuvant chemoradiation was given in 5 patients. All patients were admitted in stage III. After administration of neo adjuvant chemoradiation, among 5 patients, anterior resection was done in 3 patients(60%) and APR was done in 2 patients(40%). This leads to the conclusion that the preoperative neo adjuvant chemoradiaton is important in

improving respectability and sphincter preservation rate, but there is increased post operative morbidity like perineal wound gaping and perineal wound infection. Janjan NA et al reported almost the same 59% of sphincter preserving procedures and 41% of abdominoperinal resection in their study after neoadjuvant chemoradiation [16].

Follow up

During follow up period, 1 patient developed pelvic recurrence and 1 patient developed liver secondaries. Both patients were Stage III patients and neo adjuvant chemoradiation was not available for both of them. This shows the role of neoadjuvant chemoradiation in reducing the incidence of local recurrence and distant metastasis. In all sphincter sparing surgery done patients, follow up sigmoidoscopy was done and found to be normal.

CONCLUSION

- In our study, the peak incidence was in the 5th decade. The incidence started to rise after 30 years of age and equal distribution of cases observed before and after 50 years of age with male: female ratio 2:1. In females, carcinoma rectum occurs one decade earlier than males.

- Bleeding per rectum was the most common presentation and lower 1/3rd of rectum was the commonest site of involvement.

- Most cases presented with stage III which emphasizes the importance of the role of screening program and to create awareness of disease among general population.

- Abdomino perineal resection was the most frequently done surgery in our study. Perineal wound infection was the commonest post operative morbidity which emphasizes the need for improvement in pre-,intra-,post-,operative care.

- Neoadjuvant chemoradiation improves resectabilty and sphincter sparing rate but however there is an increased incidence of perineal wound infection and wound gaping.

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PROFORMA

Name : Age/Sex: IP No:

D.O.A. D.O.S.:

Presenting complaint Bleeding

Constipation

Pain

Tenesmus

Diarrhoea

Obstruction

Duration of symptoms (in days):

General condition Pulse

BP

Digital Rectal Examination

Proctoscopy

Colonoscopy / Sigmoidoscopy

USG Abdomen & Pelvis

CT Abdomen & Pelvis

MRI

CRT Regimen & Date of staring therapy

Lab Investigations

Hb% TC DC

Blood grouping & Rh typing

Urine

- Albumin
- Sugar
- Deposits

Blood

- Urea
- Sugar
- S.creatinine

LFT

Stool for occult blood

CXR:

ECG:

Biopsy report :

Surgical procedure

Preoperative findings:

Postoperative follow up:

ABBREVIATIONS

IMA	-	Inferior Mesenteric Artery
APC	-	Adenomatous Polyposis Colon
HNPCC	-	Hereditary Nonpolyposis Colonic Cancer
IBD	-	Inflammatory Bowel Disease
AJCC	-	American Joint Commission on Cancer
IUAC	-	International Union Against Cancer
DRE	-	Digital Rectal Examination
FSIG	-	Flexible Sigmoidoscopy
DCBE	-	Double Contrast Barium Enema
FFC	-	Fiberoptic Flexible colonoscopy
FOBT	-	Faecal Occult Blood Test
CEA	-	Carcino Embryonic Antigen
TAE	-	Trans Anal Excision
TEM	-	Trans Anal Endoscopic micro Surgery
AR	-	Anterior Resection
APR	-	AbdominoPerineal Resection
LAAPR	-	Laparoscopic Assisted AbdominoPerineal

Resection

CRT	-	Chemoradiation Therapy
L 1/3	-	Lower 1/3rd
M 1/3	-	Middle 1/3rd
U 1/3	-	Upper 1/3rd
P.W.I	-	Perineal Wound Infection
P.W.G.	-	Perineal Wound Gap
A.W.I.	-	Abdominal Wound Infection
Mets	-	Metastases
LM	-	Liver Metastasis
A	-	Ascites
LC	-	Loop Colostomy
RU	-	Retention of urine
IMP	-	Impotence
PR	-	Pelvic Recurrence

MASTER CHART																							
S.No	Age	Sex	I.P.No	Bleeding p/r	Constipation	Pain	Tenesmus	Diarrhoea	Obstruction	Duration of symptoms in days	Site	Stage I & II	Stage III	Stage IV	Site of Metastasis	Adjacent Organ Involvement	Surgery	P.O. Morbidity	P.O.Mortality	Adjuvant chemotherapy	Radio therapy	Neo adjuvant chemoradiation	FOLLOW UP
1	33	M	043158	+	+	-	-	-	-	75	L 1/3	+	-	-	-	-	APR	PWG	-	+	-	-	-
2	66	F	047144	+	-	-	-	-	-	90	M 1/3	-	-	+	LM	Bladder invasion	-	-	-	+	+	-	-
3	60	M	049149	+	-	+	-	-	-	80	U 1/3	+	-	-	-	-	AR	-	-	+	-	-	-
4	65	M	050702	-	+	-	-	-	-	60	M 1/3	-	+	-	-	-	AR	-	-	+	-	+	-
5	55	M	051016	+	+	-	+	-	+	45	L 1/3	-	-	-	-	-	LC	PATIENT NOT TURN UP					-
6	65	M	051910	+	+	+	-	-	+	30	L 1/3	-	-	+	LM	-	LC	-	-	+	-	-	-
7	34	M	059149	+	-	-	-	-	-	65	L 1/3	-	+	-	-	-	AR	-	-	+	-	+	-
8	31	M	059250	+	-	+	-	-	+	90	M 1/3	-	+	-	-	Bladder invasion	LC	-	-	+	-	-	-
9	55	M	059257	+	+	-	+	-	-	80	L 1/3	-	+	-	-	-	LAAPR	-	-	+	-	-	-
10	45	M	062586	-	-	+	+	-	+	75	L 1/3	-	-	-	-	-	LC	PATIENT NOT TURN UP					-
11	60	M	064431	+	-	-	-	+	-	60	U 1/3	+	-	-	-	-	AR	-	-	+	-	-	-
12	41	F	064829	-	+	-	-	-	-	90	L 1/3	-	+	-	-	-	APR	PWI	-	+	-	+	-
13	48	M	065894	+	+	-	-	-	-	90	M 1/3	+	-	-	-	-	APR		-	+	-	-	-
14	38	M	065919	-	-	+	-	-	-	90	M 1/3	+	-	-	-	-	APR	PWI	-	+	-	-	-
15	60	F	075117	+	+	-	-	-	-	80	L 1/3	-	+	-	-	-	APR	-	-	+	-	-	PR
16	73	M	086628	+	-	-	-	-	+	75	U 1/3	-	-	-	-	-	LC	-	+	-	-	-	-
17	40	F	093790	+	+	+	-	-	-	90	L 1/3	-	+	-	-	Sacral invasion	-	-	-	+	+	-	-
18	48	M	0106892	+	+	-	+	-	-	60	M 1/3	-	+	-	-	-	APR	-	-	+	-	-	-
19	55	M	000812	+	+	-	-	-	-	30	M 1/3	+	-	-	-	-	LAAPR	-	-	+	-	-	-
20	70	M	003738	+	-	-	-	+	-	45	M 1/3	-	+	-	-	-	APR	-	-	+	-	-	-
21	65	M	003809	-	+	-	-	-	+	75	U 1/3	-	-	-	-	-	LC	-	-	+	-	-	-
22	20	M	004421`	+	-	-	+	-	-	80	M 1/3	-	+	-	-	-	AR	RU	-	+	-	-	-
23	50	M	006795	+	+	-	+	-	-	30	L 1/3	-	+	-	-	-	AR	-	-	+	-	+	-
24	55	F	007070	+	+	-	-	-	-	90	M 1/3	+	-	-	-	-	APR	PWI	-	+	-	-	-
25	60	F	011383	+	+	+	-	-	-	90	L 1/3	-	+	-	-	Vaginal invasion	-	-	-	+	+	-	-
26	65	M	011423	+	-	-	-	-	-	70	L 1/3	-	+	-	-	-	LAAPR		-	+	-	-	LM
27	50	F	014857	-	+	-	-	-	-	85	L 1/3	-	-	+	LM+A	-	-	-	-	+	-	-	-
28	57	M	015721	-	+	-	-	-	-	90	U 1/3	-	+	-	-	-	AR	-	-	+	-	-	-
29	62	M	028449	-	+	-	+	-	-	60	L 1/3	-	+	-	-	-	LAAPR	-	-	+	-	-	-
30	67	F	037537	+	-	-	-	+	-	30	U 1/3	+	-	-	-	-	AR	-	-	+	-	-	-
31	40	F	038642	+	+	+	-	-	-	80	L 1/3	-	+	-	-	Vaginal invasion	-	-	-	+	+	-	-
32	51	M	045813	+	-	-	+	-	-	70	L 1/3	-	+	-	-	-	APR	-	-	+	-	-	-

33	40	F	046474	-	+	-	+	-	-	30	L 1/3	+	-	-	-	-	APR	RU	-	+	-	-	-
34	44	F	048333	+	-	-	-	-	-	60	M 1/3	+	-	-	-	-	APR	-	-	+	-	-	-
35	34	M	048762	+	-	-	-	-	-	60	L 1/3	+	-	-	-	-	LAAPR	-	-	+	-	-	-
36	25	M	052095	+	+	+	-	-	+	90	M 1/3	-	+	-	-	Prostate invasion +BI	LC	AWI	-	+	+	-	-
37	42	M	059149	+	-	-	+	-	-	90	L 1/3	+	-	-	-	-	APR	IMP	-	+	-	-	-
38	60	M	061909	+	+	-	-	-	-	75	L 1/3	-	+	-	-	-	APR	-	-	+	-	-	-
39	45	M	064998	+	-	-	+	-	-	60	M 1/3	-	+	-	-	-	APR	PWI	-	+	-	+	-
40	40	F	070671	-	+	-	-	-	-	70	L 1/3	+	-	-	-	-	APR	-	-	+	-	-	-
41	69	M	091189	+	-	+	-	-	+	60	L 1/3	-	-	+	LM	-	LC	-	+	-	-	-	-
42	58	M	002757	+	-	-	-	+	-	90	M 1/3	-	+	-	-	-	APR	-	-	+	-	-	-
43	48	M	008841	+	+	-	-	-	-	90	M 1/3	-	+	-	-	-	LAAPR	-	-	+	-	-	-
44	70	M	027342	+	-	+	-	-	-	30	L 1/3	+	-	-	-	-	LAAPR	-	-	+	-	-	-
45	24	F	016406	+	+	-	-	-	-	45	L 1/3	+	-	-	-	-	APR	-	-	+	-	-	-
46	55	F	047210	+	+	-	-	-	-	90	L 1/3	-	+	-	-	-	APR	-	-	+	-	-	-
47	40	F	058254	+	-	+	+	-	-	80	L 1/3	+	-	-	-	-	APR	PWI	-	+	-	-	-
48	58	M	042486	-	+	-	+	+	-	90	L 1/3	+	-	-	-	-	LAAPR	-	-	+	-	-	-
49	50	M	089308	-	+	-	-	+	-	45	M 1/3	+	-	-	-	-	LAAPR	-	-	+	-	-	-
50	41	F	083745	+	+	-	+	-	-	90	M 1/3	-	+	-	-	-	LAAPR	-	-	+	-	-	-
LM- Liver Metastasis A-Ascites APR- Abdomino Perineal Resection AR - Anterior resection LC - Loop Colostomy PR - Pelvic recurrenc																							
LAAPR - Laproscopic assisted Abdomino Perineal Resection PWG - Perineal Wound Gap PWI - Perineal Wound Infection AWI - Abdominal Wall Infectio																							
RU - Retension of Urine IMP - Impotence																							